IDENTIFYING LEARNING LEVELS OF THE 9TH GRADE STUDENTS VIA COMPUTER-AIDED TEACHING TECHNIQUES ON THE THEME "THE SHAPE AND MOVEMENTS OF THE EARTH"

9. SINIF ÖĞRENCİLERİNİN DÜNYANIN ŞEKLİ VE HAREKETLERİ KONUSUNDAKİ TEMEL KAVRAMLARI ÖĞRENME DÜZEYLERİNİN, BİLGİSAYAR DESTEKLİ ÖĞRETİM TEKNİKLERİ KULLANILARAK TESBİT EDİLMESİ

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Abstract

This research is an experimental study that aims to identify misunderstood concepts and measures the effects of the choice of method in minimizing misunderstanding in the section "The shape and movements of the Earth". Achievement test is the means used in data collection in this study. Aim of this study is to search effect of teacher based education applications, computer aided education and education applications for concept teaching on student success and attitude. The developed measurement tool has been applied to 48 students who are 9th grade students studying at a private high school. Cognitive and affective competence of the students is identified with pre-test application. Students are separated into two groups and after different education applications same groups are given post-test and their development levels are identified. Significant differences between pre-test and post-test scores are found and it is seen that this differentiation is more in computer aided applications. By making a literal questionnaire study, it has been identified there is no significant differences among the success levels and genders of students; parents education occupational an income position, whether she/he has a computer at home. The research was finished with suggestions for developing geography teaching. SPSS programme is used for

analyzing the data; two-factor ANOVA test has been used for percentage, frequency, mean and the research, repeated measures on one factor.

Key Words: Education of Geography, Movements in the world Shape, Concept Education

Özet

Bu araştırma; "Dünyanın Şekli ve Hareketleri" ünitesi konusunda hatalı öğrenilen kavramların tespit edilmesi ve bu hataların en aza indirilmesinde yöntem tercihinin etki derecesini inceleyen deneysel bir çalışmadır. Araştırmada veri toplama aracı olarak başarı testi uygulanmıştır. Bu çalışmanın amacı, öğretmen merkezli eğitim uygulamaları ile bilgisayar destekli eğitim uygulamalarının kavram öğretimine yönelik olarak yapılan, eğitim uygulamalarının öğrencilerin başarı ve tutumları üzerine olan etkisini araştırmaktır. Geliştirilen ölçme aracı özel bir lise'de 9. sınıf öğrencilerinden 48 kişiye uygulanmıştır. Yapılan ön test uygulaması ile öğrencilerin bilişsel ve duyuşsal yeterlikleri belirlenmiştir. Öğrenciler iki guruba ayrılarak farklı eğitim uygulamaları sonrasında aynı gruplara son test uygulaması yapılmış ve gelişim düzeyleri tespit edilmiştir . Elde edilen ön test ve son test puanlarına ilişkin anlamlı farklılıklaşmalar bulunmuş ve bu farklılaşma bilgisayar destekli eğitim uygulamalarında daha fazla olduğu görülmüştür. Betimsel bir anket çalışması yaparak öğrencilerin başarı düzeyleri ile cinsiyetleri, veli eğitim, mesleki ve gelir durumu, kendine ait çalışma odasının olup olmaması, evinde bilgisayarının olup olmama durumu arasında anlamlı bir farklılaşma olmadığı tespit edilmiştir. Araştırma, coğrafya öğretimini geliştirmeye yönelik önerilerle tamamlanmıştır. Arastırma verilerinin analizi "SPSS 13" paket programı ile yapılmış; araştırmanın alt problemlerine uygun olarak yüzde, frekans, aritmetik ortalama ile "tek faktör üzerinde tekrarlı ölçümler için iki faktörlü ANOVA testi kullanılmıştır.

Anahtar Kelimeler: Coğrafya Eğitimi, Dünya'nın Şekli ve Hareketleri, Kavram Öğretimi

INTRODUCTION

Sharing and proliferation of knowledge is in a rapid development with the developing information and technology. Nowadays although a lot of teaching techniques are being used for conveying information, it is seen that teacher-based lecturing techniques used in the past are insufficient and the students can't understand the information by this way. In those days of information age, the main purpose of our education system must be to upskill the students to reach the information rather than. This can be achieved with high-level mental processes. In other words, learning by grasping needs solving the problems related to the new context and skills related to scientific method process (Şenocak et al. 2003).

The information explosion has made knowledge accession and acquisition very important. For this purpose, in education field it has been started to use strategies, methods and techniques in which the learner is active and provides access to the

knowledge. One of these methods is active learning which make students more active in learning process. (Maden, 2013).

Some researches show that with the usage of information technology in the learning process, deeper learning takes place, the teaching process grows stronger, the students attend the learning process more and they don't have problems in transferring the learnt items to the real life (Tubin et al. 2003). Information Technologies that has touched almost every piece of our life have an indispensable role in the realization of both daily activities and those related to labor and education (Sarıtaş and Üner , 2013) In parallel with the developments in information technology, visual and audial materials like animation in computer environment, simulation etc. have been developed and have been used for education (Meral, 1998).

Computers have found a wide range of usages in many areas of formal and informal education for creating active learning environment. As they are used in many disciplines, they are also used in courses like geography. Besides, computer and internet could be said to be one of the most popular technology used for geography lessons as they contribute the active learning environment (Özel et al., 2007).

Computer aided instruction is using the computer for teaching the subject or the concept through the programmed lessons in the system or for reinforcing the pre-learnt behaviors (Özel et al. 2007). It is found in this study, which is aimed to find the contribution of computer aided instruction to concept teaching experimentally, that the students who make use of computer aided instruction in addition to the traditional teaching methods are more successful and have a favorable increase in their attitudes (Kadayıfçı, 1998). Using the computer in education technology will provide high efficiency both in carrying out the education in accordance with modern structure and in reaching the educational targets (Bayraktar, 1998). Computer-aided instruction with students learn how to test and to evaluate the research to reach their educational goals (Berrin and Tatar, 2012).

On the other hand, concept teaching is one of the first and the most important steps in teaching. Because, how the student learns, how he forms the knowledge, right and wrong settlement during learning the knowledge can be considered as the first steps of meaningful learning (Dönmez et al. 2008). Although some concepts are learnt by itself, it can't be said that they are learnt accurately and completely. It is stated that most of the concept are wrong- or miss- conceptualized and this an important problem (Yontar, 1991).

It is necessary to teach the individuals through a conscious and systematic teaching process in order to correct and develop the deficiencies in a way that the first concepts formed with their own experiences match up with the scientific information. Because concepts allow to create general ideas related to their own world based on the individuals' private experiences (Spitzer, D.W.1975).

Concepts play an important role in effective and meaningful learning in that they are the building blocks of one's cognitive structure where thinking and learning

take place. (Yılmaz and Çiviler 2012). It is necessary to teach the basic concepts and terms related to the learnt items completely and accurately for permanent and continuous learning.

It is reached in another experimental study that investigate the effect of using learning styles in social studies on students' misconception that teaching in accordance with learning styles makes concept teaching easy and decreases misconception significantly (Şeker ve Yılmaz, 2011).In this respect, it could be said that there are lots of concepts related to the themes in the context of geography lesson. Different teaching applications are used for learning these concepts and maintaining the learnt concepts.

For the purposes of experiment method the research aimed to investigate the effect of computer aided instruction including presentations, animations, documentaries, puzzles, map, pictures, etc. Evaluating the achievement scores of the basic concepts learning levels on "The Shape and Movement of The Earth" at geography lesson of the experimental and control group students and the answers to the following questions are sought:

1. Is there a significant difference between the post-test scores and their distribution by sex of the experimental and control groups?

2. Is there a significant difference between the post-test scores and their distribution by educational status of the parents of the experimental and control groups?

3. Is there a significant difference between the post-test scores and their distribution by professional status of the parents of the experimental and control groups?

4. Is there a significant difference between the post-test scores and their distribution by family income status of the experimental and control groups?

5. Is there a significant difference between the post-test scores and having a study room or not status of the experimental and control groups?

6. Is there a significant difference between the post-test scores and having a computer at home or not status of the experimental and control groups?

METHOD

This research is an experimental research that investigates the effect of computer assisted instruction on student success. In this research, 9th grade students that constitute the sample of the research were measured before and after the experimental operation concerning the dependent variable as required by pretest-posttest control-grouped design. Another characteristic of PPCD is that it is related design. Because same students are measured twice over the dependent variable. Besides this, because of the fact that it compares the measurement of the experimental and control group consist of different student, this design is unrelated (Dönmez et al. 2008).

Pretest-posttest control grouped design is patchwork quilt, as Büyüköztürk stated in 2002. Percentages, frequency, mean, t-test and two-way analysis of variance (ANOVA) were used in the research in accordance with the design.

Population and Sample

The students attended the research were specified among the 9th grade students at a private high school bound to Kütahya Provincial Directorate for National Education. To choose equivalent control and experimental groups, the pre-prepared achievement test about "The Shape and Movement of the Earth" was applied to the 9th grade students as pretest. Then, class 9-A whose pretest scores weren't significantly different was assigned as the experimental group, Class 9-B was assigned as the control group.

There were 24 students in the experimental group and 24 students in the control group. There were 48 students in total. The students of the experimental group were taught computer aided instruction activities in accordance with demonstration method principles. Teacher based teaching method (lecture, question and answer) based on the course book was applied to the students of control group by the researcher. Both group had two hours per week for 4 weeks.

Process Steps

The following stems were followed during the experimental process in order to increase, dynamise and make permanent the learnability status of the mentioned concepts in the Shape and The Movement of the Earth:

1. Expert opinion was taken while preparing the achievement test questions and after making the necessary corrections, 50-question pre-application test was prepared.

2. In order to make the validity and reliability studies of the pre-application test, pre-application was done on 32 students from 10th grade who studied the subject before.

3. To have equivalent groups, experimental and control groups were assigned according to their pretest scores.

4. Number of students was considered while choosing the experimental and control groups. Previous years success scores and individual differences of the students were not considered.

5. Knowledge test, pre-test was applied to both groups in order to identify whether the experimental and control groups were equal in terms of research variables and foreknowledge or not.

6. Concepts that were determined to be false learned are taught by the teaching method chosen. For four weeks the researcher used lecturing and question and answer method to control group and computer aided teaching activities to experimental group.

7. The researcher tried to explain the concepts to the control group by lecture and question and answer method during application. He draws concept figures

when necessary. Comprehension and application questions are asked to control group students and when they had difficulty in answering the questions, explanations were given.

8. Visual teaching methods were used for students of the experimental group in accordance with experimental method. Computer aided teaching methods (presentations, animations, documentaries, puzzles, map, picture, etc.) were applied. By this way, they had the opportunity to see the concepts related to "The Shape and Movement of the Earth" and the relation between the concepts. They were given the chance to examine the mentioned concepts and they filled in dumb maps.

9. At the end of this four weeks, pre-test was applied to experimental and control groups as post-test.

10. Direction of the relation between pre-test post-test achievement status of experimental and control group and sub-problems were tried to be identified. Whether or not there was a relation between independent variables of sex, parent status, educational status of parents (mother-father), profession of parents (father-mother), family income status, having a self-study room or not, having a computer at home or not and if so in what way was tried to be determined. T-test and variance analysis calculations were done according to identification of the differentiation status

11. Gathered data was analyzed.

FINDINGS

In this part of the research, findings and comments obtained as a result of the statistical analysis of whether or not there is a significant difference between pre-test, post-test achievement status of the experimental and control groups and sex, parents status, educational status of the parents (mother-father), profession of parents (mother-father), family income status, having a self-study room or not, having a computer at home or not which are independent variables will take place. The findings obtained analyzing the data collected in order to answer the sub-problems of the research are as follows:

1. Is there a significant difference between the pre-test scores of the experimental and control groups?

Whether or not there is a significant difference between the pre-test scores of experimental group and control group is analyzed. The results of the analyze is shown in Table 1.

Table 1: T-test results for the difference between the pre-test scores of experimental and control groups

Group	Measurament	Mean	Ss	N	P
Experiment	Pre test	43,1667	9,38855	24	,988
Control	Final test	43,2083	9,98250	24	

According to the results of analysis in Table 1, the mean of the pre-test scores of experimental group students is $\overline{X}$ =43,16; and this score for control group student is $\overline{X}$ = 43,20 When the pre-test means of experimental and control groups, it is seen that scores

of the groups is not different statistically(p>.05). Success of experimental and control groups and their foreknowledge can be said to be equal in terms of these data.

2. Is there a significant difference between the pre-test and post-test scores of experimental group?

Whether or not there is a significant difference between pre-test and post-test scores of the experimental group was analyzed. The results of the analysis are shown in Table 2.

Table 2: T-test results for the difference between the pre-test scores and post-test scores of experimental

Group	Measurament	Mean	Ss	N	P
Experiment	Pre test	43,1667	9,38855	24	,021
	Last test	68,0833	11,69882	24	

Pre-test score mean of experimental group students is $\overline{X}$ = 43,16; post-test score mean is $\overline{X}$ = 68,08 according to the results of the analysis in Table 2.

It is seen that post-test means are significantly higher than pre-test scores statistically according to the comparison of pre-test and post-test scores of experimental group(p<.05). This finding show that computer assigned teaching methods applied to the experimental group increased the success significantly.

3. Is there a significant difference between post-test scores of the experimental and control groups?

Whether or not there is a significant difference between post-test scores of experimental and control groups. The result of the analysis is shown in Table 3.

Table 3: T-test results for difference between post-test scores of experimental and control groups

Grup	Measurament	Mean	Ss	N	P
Experiment	Final test	68,0833	11,69882	24	,000
Control	Final test	59,1250	14,07839	24	

Post-test score mean of experimental group students is $\overline{X}$ = 68,08'; post-test score mean of contrl group is $\overline{X}$ = 59,12 according to the results of the analysis in Table 3.

It is seen that score means of experimental group are significantly higher than score means of control group statistically according to the comparison of post-test scores of experimental and control groups(p<.05). This finding show that identifying the main concept learning level about "The Shape and The Movement of The Earth" subject using computer aided teaching method is more effective on increasing the success of the student than lecture and question-answer methods.

Whether the scores of the groups differentiated before and after the experiments are significantly or not are tested with two way variance analysis (ANOVA). The results for ANOVA are shown in Table 4.

Table 4: Test results for two way variance analysis (ANOVA) to analyze the differentiated scores before and after the experiment significantly

Source of variance	KT	Sd	KO	F	P
Corrected Model	10967,208(a)	3	3655,736	27,967	,000
Intercept	273707,042	1	273707,042	2093,927	,000
Group (Control/ Experiment	477,042	1	477,042	3,649	,059
Measurement (Pre test/Final test)	10004,167	1	10004,167	76,534	,000
Group * Measurement	486,000	1	486,000	3,718	,057
Error	12025,750	92	130,715		
Total	296700,000	96			
Corrected Total	22992,958	95			

Hereunder, it is seen that main concepts learning level of the test subjects attended two different teaching method shows a significant difference from before to after and common effects applied teaching method are significant. It is seen that the results of ANOVA caused a significant difference between experimental and control groups ($F_{(1)}$=76.53, p < 0.05). This result reveals that experimental group made progress as to before experiment, compared to the group not applied computer aided teaching, it is more effective in teaching main geographical concepts.

4. Is there a significant difference between the post-test scores and their distribution by sex of the experimental and control groups?

Posttest scores of female students ($\overline{X}$ = 65.16)is found higher than the post-test scores of male students($\overline{X}$ = 61.91) in the measurements. However according to the T-test results, the relation between the sex and post-test achievements is at p > 0,05 level, and the difference in females' favor can be interpreted as insignificant.

5. Is there a significant difference between the post-test scores and their distribution by educational status of the parents of the experimental and control groups?

It is found that there is no illiterate when the educational status of parents is examined. Post-test knowledge test achievement status of the experimental and control groups and parent education level are compared and it is seen that significance level value according to x^2 test technique is (p = 0,201, p > 0,05) and there isn't a significant difference between parent educational status and post-test success of experimental and control groups statistically.

6. Is there a significant difference between the post-test scores and their distribution by professional status of the parents of the experimental and control groups?

We can say that the relationship between vocational status of parents which the value at the significancy line is at (p = 0, 920, p > 0,05) level according to x^2 test technique concerning whether or not there is a significant relationship between the

post-test knowledge test achievement status and parents professional status level and post-test achievements of experimental and control group isn't significant statistically.

7. Is there a significant difference between the post-test scores and their distribution by family income status of the experimental and control groups?

It is seen that the relationship between family income level and post-test achievements of experimental and control group aren't significant statistically. Family income level is at (p = 0, 215, p > 0,05) level at the significancy line according to x^2 technique concerning whether or not there is a significant relationship between post-test achievement status of the experimental and control group students and family income level.Post-test scores of experimental and control group as to family income level is 0,215 at the significancy line at the x^2 results table. As the given value is more than 0,05, (p = 0, 215, p > 0,05).

8. Is there a significant difference between the post-test scores and having a study room or not status of the experimental and control groups?

When evaluating in general, it is seen that the post-test achievement test mean of the students who have a study room is 62,97 and the mean of the students who don't have a study room is 70,50. There isn't a significant difference according to having a study room or not.

9. Is there a significant difference between the post-test scores and having a computer at home or not status of the experimental and control groups?

According to the U-test results, there is a significant difference between experimental and control groups according to having or not having a computer at home. It is seen that attitudes of students having computer at home ($\overline{X}$=989,50) is higher than attitudes of students not having computer at home($\overline{X}$=186,50) and the ones who have computer is more successful than the ones don't have computer. In conclusion, literature and the study results show that increase in the computer and technology opportunities has a positive effect on students' attitudes.

RESULTS

In this part, the findings acquired in accordance with research problem and sub-problems and the results obtained from commenting these findings.

Meteor is the most commonly mistaken concept on "The Shape and The Movement of the Earth". Solar day and orbital plane follows this concept. The least mistaken concepts are sphere, sun and equator. When pretest means of experimental group and control group are compared it can be said that there isn't a difference between experimental and control groups pre-test means, their achievements and foreknowledge on "The Shape and The Movement of the Earth" are equal.

According to the findings of experimental and control group pre-test and post-test scores; mean of post-test scores after the experiment is significantly higher than mean of pre-test scores before the experiment. According to the findings provided

comparing the post-test scores of experimental and control groups, score means of experimental group is statistically higher than control group.

When findings between other independent variables that can effect pre-test, post-test and permanence test achievement score means of experimental group students examined, it is seen that there isn't a significant difference between pre-test, post-test and permanence test achievement score means of experimental and control group students statistically in terms of sex variable, educational status of students' parents, professional status of students' parents family income level status, having a study room or not and they don't have an effect.

When examined from the perspective of post-test achievement status of experimental and control group students having or not having computer at home, it can be said that the attitudes of the students who have computer at home is higher. According to these results, it is seen that visual teaching methods which are prepared computer aided and used for teaching the concepts in "The Shape and The Movement of the Earth" subject makes learning easier and increases student success. It is more effective than traditional teaching method. Explaining the name, definition and characteristics of the concepts is important for more effective learning in teaching the concepts in the unit. Because complete learned concepts increases the quality of the learning level.

SUGGESTIONS

Following suggestions can be given according to the research results;

It is seen that visual teaching methods prepared computer aided are more effective than lecture and question-answer method in teaching the concepts in "The Shape and The Movement of The Earth" subject. So, teachers using more than one teaching method in teaching concepts in "The Shape and The Movement of The Earth" subject can increase the success.

Students' concept learning levels can be increased by using various instruments like, activities, models, slides, concept maps, three-dimensional shapes in teaching "The Shape and The Movement of The Earth" based on concepts. Moreover, this method can be useful for determining concepts in geography subjects that are difficult to learn and mislearned and decrease these mistakes.

Samples and sample materials that will be used in concept teaching must be in accordance with the child's development level, grade. Teacher should use applications that will increase learning instead of memorizing. The teacher should activate the students and should make the learnt items permanent.

Pilot schools should be chosen to increase the effect of visual teaching methods prepared computer aided on learning and there should be technically equipped geography classes in these schools. Lesson should be more visual and fluent by using computer and internet facilities.

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